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SOME SHALLOW-WATER OPHIURANS (ECHINODERMATA: OPHIUROIDEA) OF TAIWAN[1]

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Shyh-Min Chao, Chang-Po Chen and Kun-Hsiung Chang (1991) Some shallow-water ophiurans (Echinodermata: Ophiuroidea) of Taiwan. *Bull. Inst. Zool., Academia Sinica* **30**(2): 117-126. This report reviews the systematics of the following 10 ophiurans (6 genera of 4 families) inhabiting the shallow waters of Taiwan: *Macrophiothrix longipeda*, *Ophiocoma brevipes*, *O. dentata*, *O. pica*, *O. scolopendrina*, *O. similanensis**, *Ophiomastix annulosa*, *Ophiarachnella gorgonia**, *Ophiarachna incrassata* and *Ophioplocus imbricatus**, three of which are new records (*) for Taiwan. Diagnostic features are given for each species, along with distribution, notes on habits and colored illustrations.

Key words: Ophiurans, Echinoderms, Systematic account, Taiwan.

Several taxonomic reports (Koehler, 1922; Sato, 1938; Wu, 1982; Applegate, 1984) on the ophiurans collected from Taiwan have been published. Koehler (1922) reported 7 species: *Ophiothrix aspidota*, *O. hybrida*, *O. propinqua*, *Ophiactis savigini*, *Amphipholis misera*, *Ophiarachna incrassata* and *Ophiocoma scolopendrina*. Sato (1938) noted the occurrence of *Ophiothela danae*, *Ophiomastix annulosa*, *Ophiarthrum pictum* and *Ophioplocus japonicum*. Wu (1982) reported *Ophiocoma erinacea*. Applegate (1984) described *Ophiostigum rugosum*, *Ophiactis fuscolineata*, *Ophiactis maculosa*, *Macrophiothrix longipeda*, *Ophiothrix savignyi*, *O.* (*Keystonea*) *vicina*, *Ophiocoma brevipes*, *O. dentata*, *O. pica* and *Ophionereis porrecta*. Before this study twenty-two species belonging to 8 families have been reported.

Beginning from 1985 a long-term investigation of marine macrobenthos along the coasts of Taiwan was undertaken by a joint team comprised of members from the Institute of Zoology, Academia Sinica. This paper reports on 10 species of ophiurans collected during this study. Three of these species are new records for Taiwan: *Ophiocoma similanensis*, *Ophiarachnella gorgonia* and *Ophioplocus imbricatus*. Each of these 10 species has been adequately described in previous reports, therefore only a diagnosis of the significant features is given for each species in this report. Colored figures for these 10 species are also presented.

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MATERIALS AND METHODS

This report is based on 54 specimens of 10 species of ophiurans (6 genera of 4 families) collected from intertidal and subtidal zones of Taiwan's coastal waters using scuba-diving equipment during 18 trips between 1985-1988. Specimens inhabitating the crevices of coral and limestone rock were collected by hand using a hammer and chisel.

After their collection, the specimens were relaxed in aqueous $MgSO_4$ (80 grams $MgSO_4$ in 1 liter sea water) before they were fixed in 20% formalin in order to prevent autotomy (loss of their arms). Another convenient method used for killing these animals without causing autotomy was to put the living specimens directly into 20% ethanol (using sea water as solvent) for about five minutes before they were fixed in 20% formaline. After being fixed for two days, the specimens were air dried and deposited at the Laboratory of Marine Ecology, Institute of Zoology, Academia Sinica (ASIZ), Taipei and the Natural History Museum, Tunghai University (THUE), Taichung.

Hyman (1955) and Clark and Rowe (1971) were consulted for general taxonomic background. Arm length (a. l.) and disc diameter (d. d.) measurements were made.

SYSTEMATIC ACCOUNTS

Ophiotrichidae

Macrophiothrix longipeda (Lamarck)

(Figs. 1A, 1B, 1C)

Ophiura longipeda Lamarck, 1816: 544 (Type locality: Mascarene Islands).

Macrophiothrix longipeda, Domantay, 1966: 27-28; Clark and Rowe, 1971: 82; Devancy, 1974: 140-141; Liao, 1978: 77; Kingston, 1980: 131; Irimura, 1981: 33; Applegate, 1984: 100; Guille and Wolff, 1984: 17.

Materials: THUE-2002, 2 specimens; ASIZ-50100, 1 specimen, d.d.=1.5 and 2.5 cm, a. l.=20 and 35 cm; Nan-wang, southern Taiwan; Aug. 7, 1985.

Diagnosis: Animals always with 5 simple arms. Disc to arm ratio up to 1: 15. Disc with thorny stumps of uniform height. Arm spines with fine thorns for most of their length. Apex of each jaw with cluster of small tooth papillae. Single, small and reduced tentacle scales on each tentacle pore. Radial shields covered with sparse granules or short stumpy spines. Coloration bluish in dry specimen; larger specimens sometimes with bright line running longitudinally through both dorsal and ventral arm plates.

Distribution: Throughout the Indo-Western Pacific area but not recorded in Hawaii. In Taiwan this species is distributed in eastern and southern Taiwan and the Pescadores Islands.

Remarks: *O. longipeda* is common in intertidal pools of the reef area along southern Taiwan. The disc is always set deep in a rocky crevice with only two or three arms exposed.

Ophiocomidae

Ophiocoma brevipes Peters

(Figs. 1D, 1E, 1F)

Ophiocoma brevipes Peters, 1851: 465 (Type locality: East Africa); Domantay, 1966: 51-52; Devaney, 1970: 12-13, 1974: 151-152; Clark and Rowe, 1971: 119; Liao, 1978: 89; Okada and Ugida, 1981: 38; Applegate, 1984: 101.

Materials: THUE-2003, 1 specimen, d. d.=1.3 cm, a. l.=7 cm; ASIZ-50101, 1 specimen, d. d.=0.9 cm, a. l.=3.2 cm; Nan-wang, southern Taiwan; Aug. 7, 1985.

Diagnosis: Animals always with 5 simple arms. Dorsal and ventral arm plates clearly visible. Disc covered with dense coat of rounded granules. Two tentacle scales on each tentacle pore, 3-5 arm spines, 10-15 small tooth papillae

on each jaw, and usually 8 oral papillae present on side of each jaw. Color variable from pale to light green; arms usually with more or less distinct dark bands and disc with irregular dark spots.

Arm segment	1	2	3	4	5	6	7	8	9	10
No. of arm spines	3	3	4	4	4	5	5	5	5	5

Distribution: Throughout the Indo-Western Pacific area. In Taiwan *O. brevipes* usually found in reef areas of southern and southeastern Taiwan.

Remarks: *O. brevipes* is found underneath rocks and pebbles in the intertidal zone, occurring in association with *O. scolopendrina* and *Ophioplocus imbricatus*.

Ophiocoma dentata **Müller and Troschel**

(Figs. 1G, 1H, 2A)

Ophiocoma dentata Müller and Troschel, 1842: 99 (Type locality: unknown); Koehler, 1922: 238; Clark and Rowe, 1971: 119; Devaney, 1970: 12-18, 1974: 153-154; Liao, 1978: 89; Kingston, 1980: 134; Irimura, 1981: 45; Applegate, 1984: 101.

Materials: ASIZ-50102, 2 specimens, a. l.=9.9 and 13.2 cm, d. d.=2.8 and 2.6 cm; THUE-2001, 2 specimens, a. l.=7.3 and 7.5 cm, d. d.=1.8 and 1.7 cm; Wan-li-tung, southern Taiwan; Aug. 7, 1985.

Diagnosis: Animals always with 5 simple arms. Disc to arm ratio up to 1: 4.5. Dorsal and ventral plates clearly visible. Two tentacle scales on each tentacle pore. Dorsal disc covered with fine granules. Dise dark and variegated, usually with dark spots or in a reticulated pattern. Tooth papillae and oral papillae present on each jaw; teeth conical at the tip. Three to five clavate arm spines.

Arm segment	1	2	3	4	5	6	7	8	9	10	11	12
No. of arm spines	2	3	3	4	4	4	4	4	4	4	4	4

13	14	15	16	17
4	4	3	3	3

Distribution: Islands of Western Indian Ocean, Mascarene Islands, East Africa, Madagascar, Northern Australia, China, the South Pacific Islands and the Hawaiian Islands (Clark and Rowe, 1971). *O. dentata* distributes widely throughout the coastal areas of Taiwan.

Remarks: In Taiwan this species was first collected by Applegate (1984) from Liu-chiu Island, a tiny reef island off southern Taiwan. We found it to be the most common sublittoral ophiuran found underneath rocks and pebbles at a depth of 2-10 m. Although Applegate (1984) states that this species breeds in May and June in southern Taiwan, we collected spawning specimens off Orchid Island on Oct. 5, 1988. The eggs are red in color and 300-500 μm in diameter.

Ophiocoma pica **(Müller and Troschel)**

(Figs. 2B, 2C, 2D)

Ophiocoma pica, Müller and Troschel, 1842: 101 (Type locality: unknown); Devaney, 1970: 19-25, 1974: 159; Liao, 1978: 88; Applegate, 1984: 102.

Materials: THUE-2004, 4 specimens, d. d.=0.4-0.9 cm, a. l.=1.3-3.0 cm; ASIZ-50103, 9 specimens, d. d.=0.6-1.3 cm, a. l.= 2.0-3.8 cm; Wan-li-tung, southern Taiwan; Dec. 21, 1987.

Diagnosis: Animals always with 5 simple arms. Dorsal disc covered by dense coat of granules, while ventral interradii covered with scales. Disc dark in color and usually with radial light lines. Arms with several light bands. Two tentacle scales on each tentacle pore; 3-5 clavate arm spines, usually 4, on first 15 segments. Both oral and tooth papillae present; teeth rounded and conical at the tip.

Arm segment	1	2	3	4	5	6	7	8	9	10	11	12
No. of arm spines	3	3	4	4	5	5	5	4	4	4	4	4

13	14	15
4	4	4

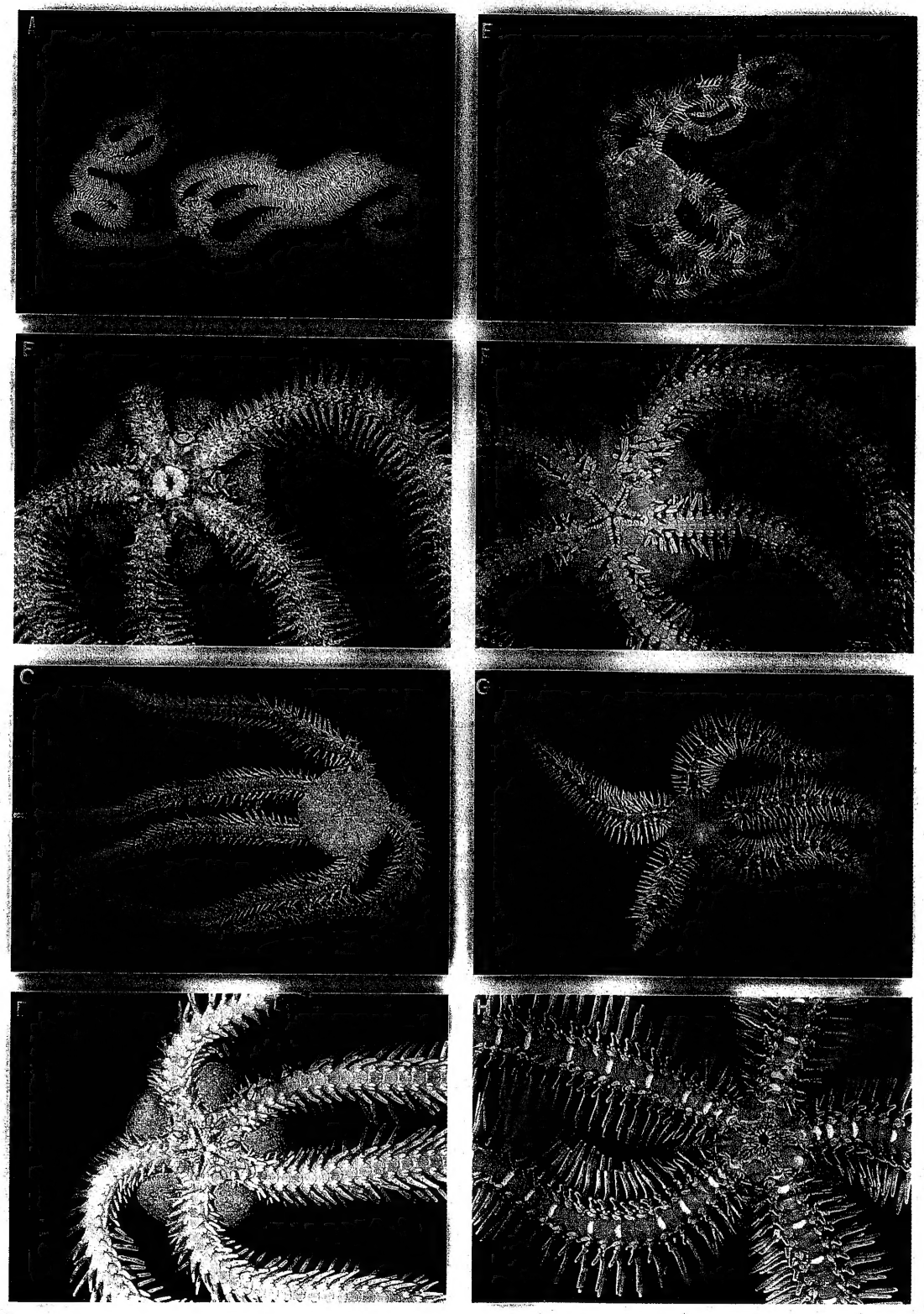

Fig. 1. A, B. *Macrophiothrix longipeda*, d. d.=1.5 cm; C, D. *Ophiocoma brevipes*, d. d.=1.3 cm;
E, F. *Ophiocoma dentata*, d. d.=2.8 cm; G, H. *Ophiocoma pica*, d. d.=0.9 mm;

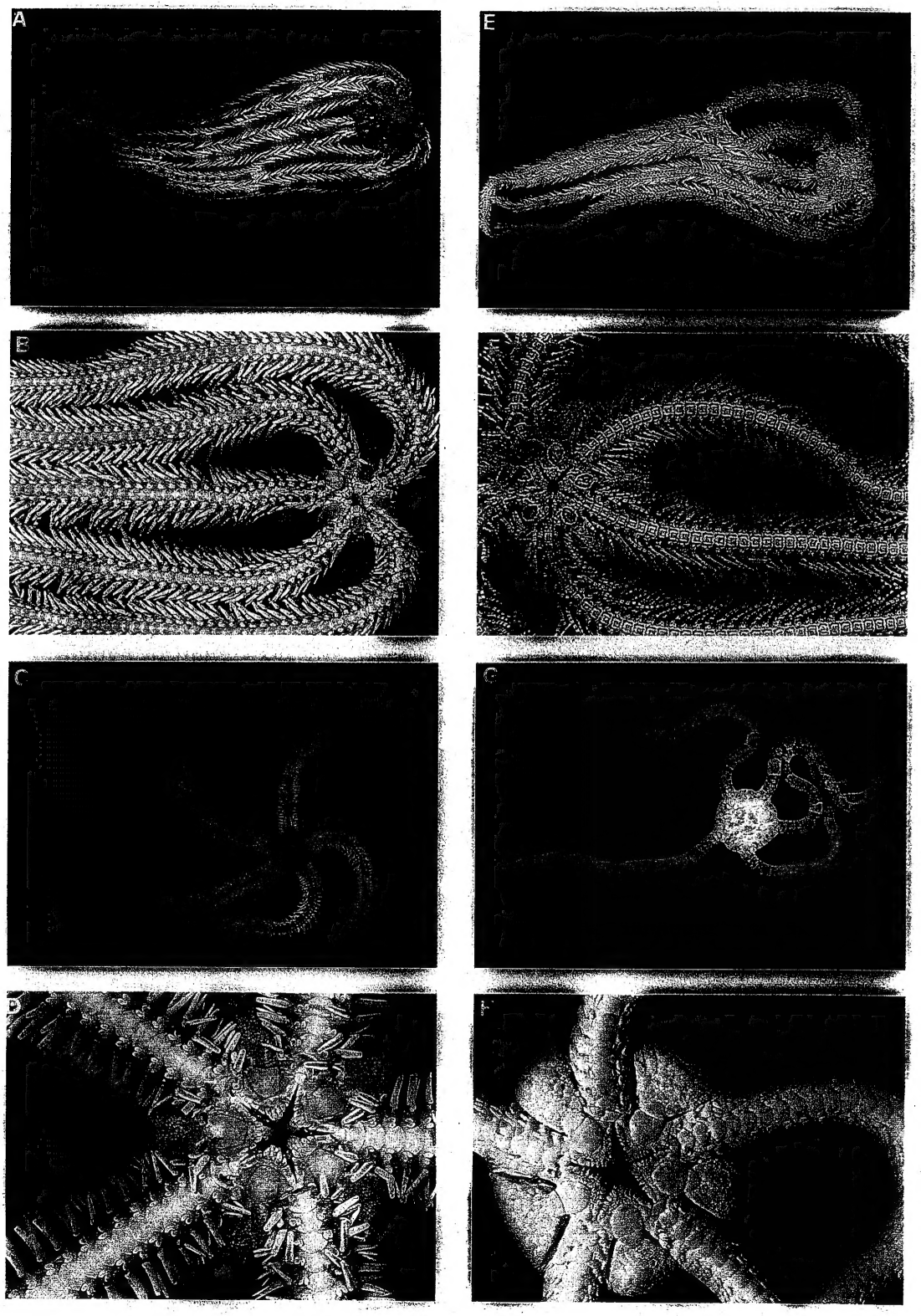

Fig. 2. A, B. *Ophiocoma scolopendrina*, d. d.=1.8 cm; C, D. *Ophiocoma similanensis*, d. d.=1.9 cm; E, F. *Ophiomastix annulosa*, d. d.=2.4 cm; G, H. *Ophiarachnella gorgonia*, d. d.=1.5 cm.

Distribution: Throughout the Indo-Western Pacific area. It is a common species in the coastal waters of Taiwan.

Remarks: *O. pica* are always found in the crevices of branching coral and rocks at a depth of 2-10 meters, but some larger specimens can be found underneath rocks and pebbles.

Ophiocoma scolopendrina (Lamarck)

(Figs. 2E, 2F, 2G)

Ophiura scolopendrina Lamarck, 1816: 544 (Type locality: Mascarene Islands)

Ophiocoma scolopendrina, Koehler, 1922: 237; Domantay, 1966: 48; Clark and Rowe, 1971: 119; Devaney, 1970: 34, 1974: 161; Liao, 1978: 87; Kingston, 1980: 134; Applegate, 1984: 102.

Materials: THUE-2005, 4 specimens, d. d.=1.6-1.8 cm, a. l.=7.4-11.5 cm; ASIZ-50104, 3 specimens, d. d.=1.7-2.0 cm, a. l.=7.7-12 cm; Wan-li-tung, southern Taiwan; Aug. 31, 1986.

Diagnosis: Animals always with 5 simple arms; 4 oral papillae on each side of jaw, 8-12 tooth papillae at apex of each jaw. Disc covered with granules which extend to ventral interadii forming a "V" shape. Arm spines clavate, uppermost arm spines always thicker and longer than underlying spines. Color variable from whitish gray to black or dark rusty brown. Arm spines banded or uniformly dark.

Arm segment	1	2	3	4	5	6	7	8	9	10	11	12
No. of arm spines	3	3	3	4	4	4	4	4	5	3	4	3

13	14	15	16	17	18
4	3	4	3	4	3

Distribution: Throughout the Indo-Western Pacific area. It is widely distributed in Taiwan and the surrounding islands.

Remarks: *O. scolopendrina* is the most common intertidal brittle star found in Taiwan. Applegate (1984) gave a detailed description of its morphological variation and some general descriptions of reproduction, growth and ecology. Usually the females are larger and darker than the males.

Ophiocoma similanensis Bussarwait and Rowe

(Figs. 2H, 3A, 3B)

Ophiocoma similanensis Bussarwait and Rowe, 1985: 1-6 (Type locality: Thailand).

Materials: THUE-2007, 4 specimens, d. d.=1.9-2.1 cm, a. l.=7.9-9.0 cm; ASIZ-50109, 2 specimens, d. d.=1.8-2.0 cm, a. l.=7.7-8.9 cm; Nan-wang, southern Taiwan; Aug. 7, 1985.

Diagnosis: Animals always with 5 simple arms, 2 tentacle scales and 3 or 4 arm spines. Both tooth papillae and oral papillae present; genital papilla clearly visible. Disc covered with granules which extend to ventral interradii forming a "V" shape. Upper-most spines always thicker and longer than underlying spines. Color of specimen uniformly black or blackish-brown over whole body.

Arm segment	1	2	3	4	5	6	7	8	9	10	11	12
No. of arm spines	3	3	3	4	4	4	4	4	4	3	4	4

13	14	15	16	17	18	19	20
4	3	4	3	4	3	4	3

Distribution: Thailand and Taiwan.

Remarks: *O. similanensis* resembles *O. scolopendrina* but can be distinguished by its uniformly darker coloration, its clearly visible genital papilla, and its smaller ratio of d. d./a. l. The habitats of these two species are quite different. *O. similanesis* is found in the crevices of branching coral at a depth of 2-5 m, whereas *O. scolopendrina* is always found in the intertidal zone.

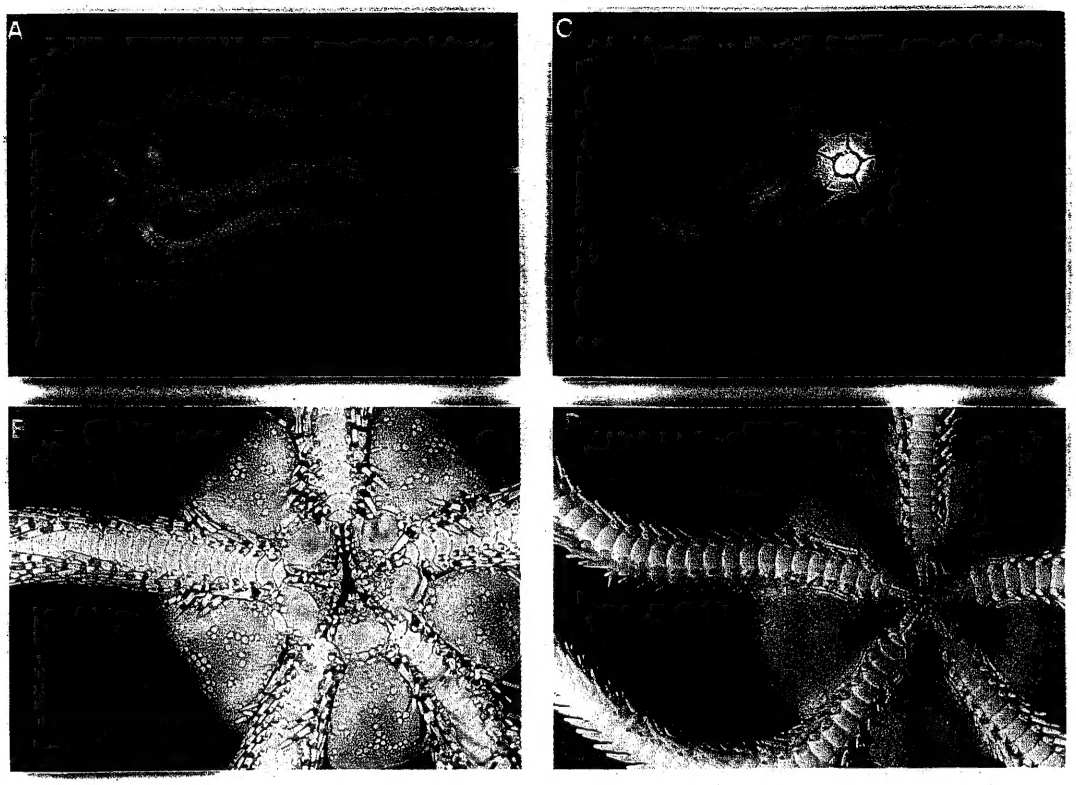

Fig. 3. A, B. *Ophiarachna incrassata*, d. d.=1.5 cm; C, D. *Ophioplocus imbricatus*=1.5 cm.

***Ophiomastix annulosa* (Lamarck)**

(Figs. 3C, 3D, 3E)

Ophiura annulosa Lamarck, 1816: 543 (Type locality: unknown); Devaney, 1978: 280-284; Okada and Ugida, 1981: 39; Applegate, 1984: 104.

Materials: THUE-2008, 1 specimen, d. d.=2.4 cm, a. l.=16.5 cm; ASIZ-50106, 2 specimens, d. d.=2.3 and 2.4 cm, a. l.=16 and 18 cm; Shan-geo-wang, southern Taiwan; Aug. 18, 1988.

Diagnosis: Animals always with 5 simple arms, two tentacle scales, and usually 3 or 4 arm spines. Both oral and tooth papillae present. Disc covered with numerous dark brown spots in dry specimens and with scattered spines with brown bands. For every 4-6 arm segment, one conspicuous enlarged clavate spine with expanded and with 4-6 projections, whereas other underlying spines more slender.

Arm segment	1	2	3	4	5	6	7	8	9	10	11	12
No. of arm spines	2	3	3	3	4	4	4	4	5	4	4	3

13	14	15	16	17	18	19	20
3	4	3	3	3	4	3	3

Distribution: Maldive area, Ceylon area, Bay of Bengal, East Indies, Northern Australia, Philippine Islands, China, Southern Japan and the South Pacific Islands (Clark and Rowe, 1971). This species is widely distributed in Taiwan and the surrounding islands.

Remarks: *O. annulosa* is common in the crevices of rocks at a depth of 1-8 m.

Ophiodermatidae

***Ophiarachnella gorgonia* (Müller and Troschel)**

(Figs. 3F, 3G, 3H)

Ophiarachna gorgonia Müller and Troschel, 1842:

105 (Type locality: unknown).

Ophiarachnella gorgonia, Domantay, 1966: 60; Domantay and Conlu, 1968: 166; Clark and Rowe, 1971: 125; Liao, 1978: 93; Irimura, 1981: 43-44; Okada and Ugida, 1981: 44; Clark and Rowe, 1971: 125.

Materials: THUE-2009, 4 specimens, d. d.=1.5-2.0 cm, a. l.=5.5-8.0 cm; ASIZ-50107, 2 specimens, d. d.=1.6 and 1.7 cm, a. l.=6.0 and 6.3 cm; Pescadores Islands, western Taiwan; Mar. 14, 1985.

Diagnosis: Animals always with 5 simple arms, 2 tentacle scales, and usually 12 arm spines. Disc covered with granules; some larger specimens with visible imbricating scales beneath these granules. Oral plates covered with granules. Radial shields smooth and clearly visible. Supplementary oral shields large, and often equal to or smaller than oral shield in width. Dry specimens light brown with red or purple bands on arms; ventral side lighter than oral side.

Arm segment	1	2	3	4	5	6	7	8	9	10	11
No. of arm spines	3	3	3	5	6	8	10	12	12	12	12
	12	13	14	15	16	17	18				
	12	11	12	12	12	12	12				

Distribution: Islands of Western Indian Ocean, Mascarene Islands, East Africa and Madagascar, Ceylon area, Bay of Bengal, East Indies, Northern Australia, Philippine Islands, China, Southern Japan and the South Pacific Islands (Clark and Rowe, 1971).

Remarks: *O. gorgonia* is quite common in the intertidal zone to a depth of 5 m around the Pescadores Islands. Two specimens were collected from a depth of 18 m around Orchid Island, southeastern Taiwan. All specimens were collected underneath rocks and pebbles.

***Ophiarachna incrassata* (Lamarck)**

(Figs. 4A, 4B, 4C)

Ophiura incrassata Lamarck, 1816: 542 (Type locality: unknown)

Ophiarachna incrassata, Koehler, 1922: 336; Domantay, 1966: 62; Clark and Rowe, 1971: 123; Irimura, 1981: 44; Applegate, 1984: 106.

Materials: THUE-2006, 1 specimen, d. d. =2.3 cm, a. l.=10 cm; ASIZ-50108, 1 specimen, d. d.=3.5 cm, a. l.=15.8 cm; Mou-bi-tou, southern Taiwan; Aug. 7, 1985.

Diagnosis: Animals always with 5 simple arms and 2 tentacle scales on each pore. Disc covered with dense coat of granules. Oral plates covered with granules. Only oral papillae present. Disc and arms green in living specimen; disc always with black-ringed yellow spots.

Distribution: Islands of Western Indian Ocean, East Africa and Madagascar, Ceylon area, Bay of Bengal, East Indies, Northern Australia, Philippine Islands, China, Southern Japan, the South Pacific Islands and the Hawaiian Islands (Clark and Rowe, 1971).

Remarks: *O. incrassata* is found underneath pebbles and rocks at a depth of 2-6 meters. It is quite common along the coast of northeastern Taiwan but is rarely seen in the southern Taiwan reef area. Large aggregations are found during their reproductive season.

Ophiuridae

***Ophioplocus imbricatus* (Müller and Troschel)**

(Figs. 4D, 4E, 4F)

Ophiolepis imbricatus Müller and Troschel, 1842: 93 (Type locality: Mascarene Islands).

Ophioplocus imbricatus, Domantay, 1966: 66; Clark and Rowe, 1971: 128; Okada and Ugida, 1981: 40.

Materials: ASIZ-50109, 4 specimens, d. d.=0.5-1.5 cm, a. l.=2.1-6.0 cm; THUE-2010, 4 specimens, d. d.=1.0-1.6 cm, a. l.= 4.2-6.6 cm; Nan-wang and Wan-li-tung, southern Taiwan; Nov. 14, 1985.

Diagnosis: Animals always with 5

simple arms and 3 small arm spines mounted on one of medial lateral plates, but first 4-5 arm segments without arm spines. Proximally dorsal arm plate usually composed of 8 regular plates and 3-9 small plates. Disc covered with imbricating plates of different sizes and shapes. Ventral arm plates square to rectangular in shape. Two tentacle scales on each pore. Aboral disc with color pattern of black pentagons, with 5 dark lines running through interadii of both sides. Small specimen with incomplete pentagon and line pattern. Color usually gray or olive brown.

Distribution: Throughout the tropical Indo-Pacific area.

Remarks: *O. imbricatus* is found under pebbles, rocks and dead coral fragments in the intertidal zone of the southern Taiwan reef area. This species is uncommon but can be found in the same habitat with *O. brevipes*.

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REFERENCES

Applegate, A. L. (1984) Echinoderms of southern Taiwan. *Bull. Inst. Zool., Academia Sinica* **23**: 93-118.

Bussarawit, S. and F. W. E. Rowe (1985) A new species in the ophiocomid genus *Ophiocoma* (Echinodermata: Ophiuroidea) from the west coast of Thailand, Andaman Sea. *Phuket Mar. Biol. Center Res. Bull.* 6 pp.

Clark, A. M. and F. W. E. Rowe (1971) Monograph of shallow-water Indo-West Pacific echinoderm. *Brit. Mus. (Nat. Hist.) Publ.* 238 pp.

Devaney, D. M. (1970) Studies on *Ophiocoma* brittlestars. I. A new genus (*Clarkcoma*) of Ophiocominae with a reevaluation of the genus *Ophiocoma*. *Smithson. Contrib. Zool.* **51**: 1-41.

Devaney, D. M. (1974) Shallow-water asterozoans of southern Polynesia. II. Ophiuroidea. *Micronesica* **10**: 105-204.

Devaney, D. M. (1978) A review of the genus *Ophiomastix* (Ophiuroidea: Ophiocomidae). *Micronesica* **14**: 273-359.

Domantay, J. S. and C. R. Domantay (1966) Studies on the classification and distribution of Philippine littoral Ophiuroidea (Brittle stars). *Philip. J. Sci.* **95**: 1-76.

Domantay, J. S. and P. Conlu (1968) The echinoderm fauna of Manila Bay. *Philip. J. Sci.* **97**: 159-171.

Guille, A. and W. J. Wolff (1984) Resultats biologiques de l'expedition snellius. Echinodermata: Ophiuroidea. *Zoologische Verhandelingen* **213**: 1-39.

Hyman, L. H. (1955) *The invertebrates: Echinodermata.* McGraw-Hill Book Co., New York. 763 pp.

Irimura, S. (1981) Ophiurans from Tanabe Bay and its vicinity, with the description of a new species of Ophiocentrus. *Publ. Seto Mar. Biol. Lab.* **26**: 15-49.

Koehler, R. (1922) Ophiurans of the Philippines seas and adjacent waters. *Bull. U. S. Nat. Mus.* **100**: 1-480.

Kingston, S. C. (1980) The Swain reefs expedition: Ophiuroidea. *Rec. Aust. Mus.* **33**: 123-147.

Lamarck, J. B. P. A. (1816) *Histoire naturelle des animaux sans vertibres.* Paris. Ed. I. **2**: 522-568.

Liao, Y. L. (1978) The echinoderms of the Xisha, Guangdong Province, China. II. Ophiuroidea. *Studia Marina Sinica* **12**: 69-102.

Müller, J. and F. H. Troschel (1842) *System der Asteriden.* Braunschweig. 134 pp.

Kingston, S. C. (1980) The Swain Reef Expedition: Ophiuroidea. *Rec. Aust. Mus.* **33**(3): 123-147.

Koehler, R. (1922) Ophiurans of the Philippines seas and adjacent waters. *Bull. U. S. Nat. Mus.* **100**(5): 1-480.

Okada, A. and C. Ugida (1981) *New Illustrated Encyclopedia of the Fauna of Japan.* Hokuryu-kan Co. Ltd., Tokyo. 763 pp.

Peters, W. (1851) Ubersicht der von ihm an der huste von Mossambique eingesammelten Ophiuren, unter denen sich zwei neue Gattungen befindne. *Ber. K. preuss. Akad. Wiss.* 1951: 463-466.

Sato, H. (1938) A collecting note on Taiwan littoral animals. *Bot. and Zool. Tokyo* **4**: 1435-1442, 1619-1624, 1789-1794, 1951-1957 (In Japanese) (Not seen).

Wu, S.K. (1982) The ophiurians (Echinodermata: Ophiuroidea) of Taiwan. *Biol. Bull. Taiwan Normal Univ.* **17**: 15-23.

部份臺灣產陽燧足

趙世民　陳章波　張崑雄

本文描述分屬於4科6屬10種之臺灣產陽燧足：*Macrophiothrix lonipeda*, *Ophiocoma brevipes*, *O. dentata*, *O. pica*, *O. scolopendrina*, *O. similanensis**, *Ophiomastix annulosa*, *Ophiarachnella gorgonia**, *Ophiarachna incrassata* 及 *Ophioplocus imbricatus** 。其中三種爲臺灣新記錄種(*)。鑑定特徵、分佈、習性及彩色標本照均含於本文中。